

No.

200300291



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Texas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREBUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR PLANT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED, (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT.

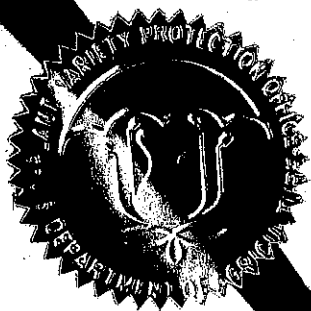
1542, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'TAM 111'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this eighteenth day of February, in the year two thousand and four.

Attest:



Commissioner

Plant Variety Protection Office
Agricultural Marketing Service

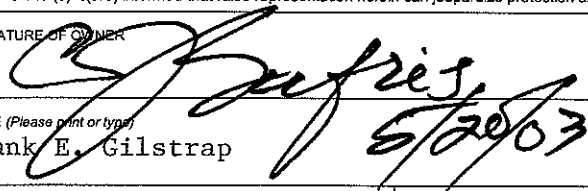
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Texas Agricultural Experiment Station		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME TX95A3091		3. VARIETY NAME TAM 111	
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) Dr. Frank E. Gilstrap Associate Agency Director, TAES 2147 TAMU College Station, TX 77843-2147		5. TELEPHONE (include area code) 979-845-4747		FOR OFFICIAL USE ONLY PVPO NUMBER 200300291 FILING DATE July 24, 2003 Certificate fee FILING AND EXAMINATION FEES: FEES \$ 432.00 DATE 02/03/2004 PERMIT FEE \$ 3652.00 DATE 7/24/2003	
6. FAX (include area code) 979-458-4765		7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) State of Texas Research Agency			
8. IF INCORPORATED, GIVE STATE OF INCORPORATION		9. DATE OF INCORPORATION			
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Janie Hurley Technology Licensing Manager, Agriculture/Life Sciences Technology Licensing Office The Texas A&M University System 3369 TAMU College Station, TX 77843-3369					
11. TELEPHONE (include area code) 979-847-8682		12. FAX (include area code) 979-845-1402		13. E-MAIL jhurley@tamu.edu	
14. CROP KIND (Common Name) wheat					
15. GENUS AND SPECIES NAME OF CROP Triticum aestivum L. em. Thell		16. FAMILY NAME (Botanical) Poaceae		17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$3,652), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)		19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? See Section 83(a) of the Plant Variety Protection Act <input checked="" type="checkbox"/> YES (If "yes", answer items 20 and 21 below) <input type="checkbox"/> NO (If "no", go to item 22) 20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, WHICH CLASSES? <input checked="" type="checkbox"/> FOUNDATION <input checked="" type="checkbox"/> REGISTERED <input checked="" type="checkbox"/> CERTIFIED 21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input checked="" type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)			
22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)			
24. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.					
SIGNATURE OF OWNER 		SIGNATURE OF OWNER			
NAME (Please print or type) Frank E. Gilstrap		NAME (Please print or type)			
CAPACITY OR TITLE Associate Agency Director, TAES		DATE		CAPACITY OR TITLE	
				DATE	

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$3,652 (\$432 filing fee and \$3,220 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvpo/pvp.htm>

ITEM

- 18a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
- (1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
19. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
22. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
23. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

21. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

22. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

23. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089. <http://www.ams.usda.gov/lsg/seed.htm>

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 3.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

ST-470 (02-10-2003) designed by the Plant Variety Protection Office with Word 2000. Replaces former versions of ST-470, which are obsolete.

Exhibit A

Origin and Breeding History for 'TAM 111' Wheat

'TAM 111' is a wheat (*Triticum aestivum* L. em. Thell) cultivar with the pedigree 'TAM 107'//TX78V3630/'Centurk78'/3/TX87V1233. TX78V3630 has the pedigree 'Sturdy' sib/'Kaw'/'Centurk'. TX87V1233 has the pedigree TX78V3630/'Jupeteco'/'Bluejay'. 'TAM 111' was developed and released¹ by the Texas Agricultural Experiment Station (TAES) as an improved variety of hard red winter wheat (HRWW) in 2002. The line was tested under the experimental name TX95A3091. The cross that was the source of the selection, TX95A3091, was made in the greenhouse at Vernon, TX in 1990. Bulk populations were maintained in the field until 1993, when a single head from an F₄ plant was selected at Bushland, TX and planted in an F₅ headrow nursery in 1994. From that headrow, 2 single rows were grown for increase in 1995. The selection was then entered in the 1996 Preliminary 1 Yield Nursery. Based upon yield performance, especially at Bushland, it was advanced to the High Plains Dryland Yield Nursery in 1997, 1998 and 1999. TX95A3091 was grown in the 1999 and 2000 Western Plains Regional Performance Nursery and in 2000 and 2001 was placed in the West Texas Elite Nursery and the Southern Regional Performance Nursery. An initial increase of breeder seed of one-half acre was grown on USDA/ARS research land at Bushland in 1999-2000. That field was rogued and harvested with a previously cleaned small-plot combine. In 2001, an 11-acre increase was produced on irrigated land that had been fallow for one year, and previously planted with sorghum in the summer of 1999, at the same facility. A strip of about ½ acre from that field was heavily rogued, and seed from that strip was used to plant two fields in the fall of 2001, each about 5 acres. The primary justifications for release are high dryland yield performance on the High Plains, combined with tall stature for a semi-dwarf and maturity contrasting with current best varieties for the Texas High Plains production area.

'TAM 111' is awned, taller than most semidwarfs, with white chaff color. It may be grown in most of the U.S. hard winter wheat region, but is best adapted to the southern High Plains region. Principal features of 'TAM 111' are (1) high yield, (2) excellent drought resistance, (3) tall stature relative to semidwarf wheat varieties, and (4) good HRWW processing quality.

'TAM 111' has been observed for 9 generations during testing and seed increase, and is stable and uniform. Variants appear as follows: (i) approximately 0.2% of plants exhibit one tiller that is ½ to 1 head length taller than the rest of the canopy at maturity, (ii) approximately 0.1% of plants have bronze chaff at maturity, (iii) approximately 0.05% of plants lack awns, and (iv) about 3-4 weeks prior to maturity, approximately 0.1% of plants exhibit a blue-green head coloration. These variants are commercially acceptable and predictable.

¹In this context, "released" refers to review and approval of the scientific merit used during the development of 'TAM 111' by an internal TAES committee and does not indicate a transfer or sale of the variety to another party.

Exhibit B. Novelty Statement for 'TAM 111' Wheat

'TAM 111' is a hard red winter wheat variety well adapted to the southern High Plains region of the United States, due to its unique combination of high relative grain yield under both high yield (irrigated) and low yield (rainfed) production systems, excellent drought resistance, height intermediate between those of standard-height cultivars and semidwarf cultivars, and intermediate maturity.

'TAM 111' is most similar to 'TAM 107'; however, 'TAM 111' is taller than 'TAM 107' (by an average of 6 cm), and later maturing than 'TAM 107' (by an average of 5 days). Tabular data attached demonstrate the distinctions between 'TAM111' (tested as TX95A3091) and other adapted varieties. Yield and agronomic data presented are the means of 3 replicates for each variety at each location in each year. Each single plot contained about 1,200 plants. More information is provided below.

Height: One of the key attributes of TX95A3091 is tall stature compared to modern, semidwarf varieties. Particularly under the very dry conditions to which it is adapted, greater plant height is an important factor in permitting complete mechanical grain harvest without risk of harvesting soil or low-lying weeds that contribute to dockage. TX95A3091, measured at maturity, is taller than other semidwarf varieties adapted to the southern Great Plains, such as TAM 107, TAM 200, Trego and Akron by 4 to 20 cm (1.5 to 8 inches), depending on location and year (Table 1). Note that Larned, Arapahoe and Prowers are checks with adaptation to the central western plains. Height of the selection is similar to height of these varieties in their area of adaptation.

Maturity: Current varieties best adapted to dryland production on the southern High Plains have maturities that fit a window permitting them to reach flowering and grain-filling (the stages most susceptible to temperature and water stresses) between late frost and early high-temperature stress. Individual years produce widely fluctuating windows of opportunity, however. Early-maturing varieties that escape early high temperatures will sometimes succumb to late spring freeze, while later maturing varieties can suffer the opposite fate. Growers need to be able to spread their risk by planting varieties of differing maturity without losing yield potential. TX95A3091 clearly matures later than cultivars currently adapted to dryland production in the southern High Plains, such as TAM 107, TAM 110, Jagger and Custer (Table 2). Maturity for TX95A3091 is moderate, slightly later than that of the much shorter-statured TAM 200.

Table 1. Height (cm) at maturity of TX95A3091 and check varieties in two nurseries.

Crop Year	Nursery ^a	Cultivar or Selection	Chillicothe ^b	Bushland	Washburn	Stinnett	Archer, WY	Akron, CO	Goodwell, OK	Colby, KS
1998	HPD	TX95A3091	71	76						
		TAM 200	60	62						
		Larned	72	81						
		Arapahoe	68	74						
		TAM 107	66	69						
		LSD (.05)	3	2						
1999	HPD	TX95A3091	86	100	98	94				
		TAM 200	63	85	78	72				
		Larned	90	106	108	102				
		Arapahoe	82	92	90	88				
		TAM 107	75	84	81	77				
		TAM 302	80	92	87	84				
		Akron	81	92	85	83				
		LSD (.05)	4	5	6	5				
1999	WPRPN	TX95A3091	92			54	79	100	93	
		Trego	85			50	66	95	86	
		Larned	99			57	86	107	100	
		Arapahoe	95			51	74	101	95	
		Prowers	90			58	87	92	97	
		LSD (.05)	4			3	4	4		
2000	WPRPN	TX95A3091	71			42		80	76	
		Trego	63			36		73	70	
		Larned	81			46		89	80	
		Arapahoe	68			39		76	78	
		Prowers	71			43		81	86	
		Millenium	68			40		77	81	
		LSD (.05)	3			2		3	3	

^aNurseries identified are HPD (High Plains Dryland) and WPRPN (Western Plains Regional Performance Nursery).^bLocations without state identifications are in Texas.

Table 2. Heading date (Julian day) of TX95A3091 and check varieties in two nurseries.

Crop Year	Nursery ^a	Cultivar or Selection	Chillicothe	Bushland	Washburn
1998	HPD	TX95A3091		123	125
		TAM 200		124	122
		Larned		125	126
		Arapahoe		125	125
		TAM 107		121	119
		LSD (.05)		1	2
1999	HPD	TX95A3091	110	121	119
		TAM 200	107	121	118
		Larned	113	122	121
		Arapahoe	114	123	120
		TAM 107	102	117	114
		TAM 302	109	126	117
		Akron	112	123	120
		LSD (.05)	2	2	2
2000	WTE	TX95A3091		116	119
		TAM 200		114	115
		TAM 107		111	110
		TAM 110		111	111
		TAM 202		112	111
		TAM 302		116	117
		Custer		112	113
		Jagger		111	111
		Trego		116	117
		Ogallala		115	114
		LSD (.05)		2	3

^aNurseries identified are High Plains Dryland (HPD) and West Texas Elite (WTE).

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*Triticum* spp.)

NAME OF APPLICANT(S)	FOR OFFICIAL USE ONLY
	PVPO NUMBER
	200300291
	VARIETY NAME
ADDRESS (Street and No. or RD No., City, State, and Zip Code)	TEMPORARY OR EXPERIMENTAL DESIGNATION

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. or) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

<input type="text" value="1"/>	1=Common	2=Durum	3=Club	4=Other (SPECIFY):
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2. VERNALIZATION:

<input type="text" value="2"/>	1=Spring	2=Winter	3=Other (SPECIFY):
--------------------------------	----------	----------	--------------------

3. COLEOPTILE ANTHOCYANIN:

<input type="text" value="1"/>	1=Absent	2=Present
--------------------------------	----------	-----------

4. JUVENILE PLANT GROWTH:

<input type="text" value="2"/>	1=Prostrate	2=Semi-erect	3=Erect
--------------------------------	-------------	--------------	---------

5. PLANT COLOR (boot stage):

<input type="text" value="2"/>	1 = Yellow-Green	2 = Green	3 = Blue-Green
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6. FLAG LEAF (boot stage):

<input type="text" value="1"/>	1 = Erect	2 = Recurved	<input type="checkbox"/>	1 = Not Twisted	2 = Twisted
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7. EAR EMERGENCE:

<input type="text" value="0"/> <input type="text" value="2"/>	Number of Days Earlier Than Larned	*
<input type="text" value="0"/> <input type="text" value="2"/>	Number of Days Later Than TAM 200	*

9. ANTER COLOR:

☐ 1

1 = Yellow

2 = Purple

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10. PLANT HEIGHT (from soil to top of head, excluding awns):

☐ 0 ☐ 6

cm Taller Than TAM 107

☐ 0 ☐ 7

cm Shorter Than Larned

* Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

10. STEM:

A. ANTHOCYANIN

☐ 1

1 = Absent

2 = Present

B. WAXY BLOOM

☐ 1

1 = Absent

2 = Present

C. HAIRINESS (last internode of rachis)

☐ 1

1 = Absent

2 = Present

D. INTERNODE (SPECIFY NUMBER)

☐ 1

1 = Hollow

2 = Semi-solid

3 = Solid

E. PEDUNCLE

☐ 2

1 = Absent

2 = Present

☐ 11

cm Length

11. HEAD (at Maturity):

A. DENSITY

☐ 3

1 = Lax

2 = Middense

3 = Dense

B. SHAPE

☐ 1

1 = Tapering

2 = Strap

3 = Clavate

4 = Other (SPECIFY):

C. CURVATURE

☐ 2

1 = Erect

2 = Inclined

3 = Recurved

D. AWNEDNESS

☐ 4

1 = Awnless

2 = Apically Awnletted

3 = Awnletted

4 = Awned

12. GLUMES (at Maturity):

A. COLOR

☐ 1

1 = White

2 = Tan

3 = Other (SPECIFY):

C. BEAK

☐ 3

1 = Obtuse

2 = Acute

3 = Acuminate

B. SHOULDER

☐ 2

1 = Wanting

2 = Oblique

3 = Rounded

4 = Square

5 = Elevated

6 = Apiculate

D. LENGTH

☐ 1

1 = Short

2 = Medium

(ca. 7mm)

(ca. 8mm)

3 = Long (ca. 9mm)

2. GLUMES (at Maturity) Continued:

E. WIDTH

☐ 2 1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm)
3 = Wide (ca. 4mm)

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13. SEED:

A. SHAPE

☐ 1 1 = Ovate 2 = Oval 3 = Elliptical

C. BRUSH

☐ 2 1 = Short 2 = Medium 3 = Long

☐ 1 1 = Not Collared 2 = Collared

B. CHEEK

☐ 1 1 = Rounded 2 = Angular

D. CREASE

☐ 1 1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel

☐ 1 1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

E. Color

☐ 3 1 = White 2 = Amber 3 = Red
4 = OTHER (Specify)

G. PHENOL REACTION (see instructions):

☐ 1 1 = Ivory 2 = Fawn
3 = Light Brown 4 = Dark Brown
5 = Black

F. TEXTURE

☐ 1 1 = Hard 2 = Soft

14. DISEASE: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

☐ 2 Stem Rust (*Puccinia graminis* f. sp. *tritici*)

☐ 1 Leaf Rust (*Puccinia recondita* f. sp. *tritici*)

☐ 2 Stripe Rust (*Puccinia striiformis*)

☐ 0 Loose Smut (*Ustilago tritici*)

☐ 0 Tan Spot (*Pyrenophora tritici-repentis*)

☐ 0 Flag Smut (*Urocystis agropyri*)

☐ 0 Halo Spot (*Selenophoma donacis*)

☐ 0 Common Bunt (*Tilletia tritici* or *T. laevis*)

☐ 1 *Septoria nodorum* (Glume Blotch)

☐ 0 Dwarf Bunt (*Tilletia controversa*)

☐ 0 *Septoria avenae* (Speckled Leaf Disease)

☐ 0 Karnal Bunt (*Tilletia indica*)

☐ 1 *Septoria tritici* (Speckled Leaf Blotch)

☐ 0 Powdery Mildew (*Erysiphe graminis* f. sp. *tritici*)

☐ 0 Scab (*Fusarium* spp.)

☐ 0 "Snow Molds"

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

200300291

<input type="checkbox"/> 0	"Black Point" (Kernel Smudge)	<input type="checkbox"/> 0	Common Root Rot (<i>Fusarium</i> , <i>Cochliobolus</i> and <i>Bipolaris</i> spp.)
<input type="checkbox"/> 3	Barley Yellow Dwarf Virus (BYDV)	<input type="checkbox"/> 0	Rhizoctonia Root Rot (<i>Rhizoctonia solani</i>)
<input type="checkbox"/> 1	Soilborne Mosaic Virus (SBMV)	<input type="checkbox"/> 0	Black Chaff (<i>Xanthomonas campestris</i> pv. <i>translucens</i>)
<input type="checkbox"/> 0	Wheat Yellow (Spindle Streak) Mosaic Virus	<input type="checkbox"/> 0	Bacterial Leaf Blight (<i>Pseudomonas syringae</i> pv. <i>syringae</i>)
<input type="checkbox"/> 3	Wheat Streak Mosaic Virus (WSMV)	<input type="checkbox"/>	Other (SPECIFY)
<input type="checkbox"/>	Other (SPECIFY)	<input type="checkbox"/>	Other (SPECIFY)
<input type="checkbox"/>	Other (SPECIFY)	<input type="checkbox"/>	Other (SPECIFY)
<input type="checkbox"/>	Other (SPECIFY)	<input type="checkbox"/>	Other (SPECIFY)

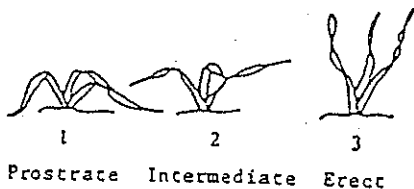
15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

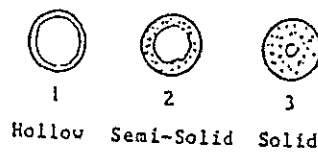
<input type="checkbox"/> 1	Hessian Fly (<i>Mayetiola destructor</i>)	<input type="checkbox"/>	Other (SPECIFY)
<input type="checkbox"/> 0	Stem Sawfly (<i>Cephus</i> spp.)	<input type="checkbox"/>	Other (SPECIFY)
<input type="checkbox"/> 0	Cereal Leaf Beetle (<i>Oulema melanopa</i>)	<input type="checkbox"/>	Other (SPECIFY)
<input type="checkbox"/> 1	Russian Aphid (<i>Diuraphis noxia</i>)	<input type="checkbox"/>	Other (SPECIFY)
<input type="checkbox"/> 1	Greenbug (<i>Schizaphis graminum</i>)	<input type="checkbox"/>	Other (SPECIFY)
<input type="checkbox"/> 0	Aphids	<input type="checkbox"/>	Other (SPECIFY)

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS

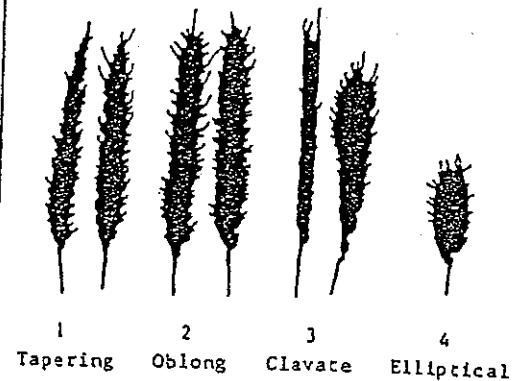
2. EARLY PLANT GROWTH HABIT:



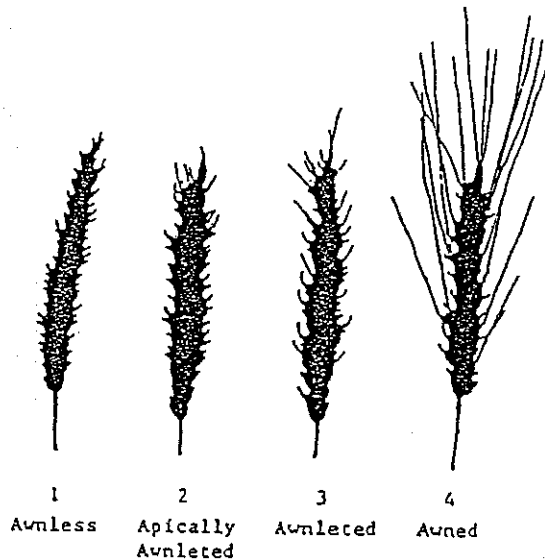
STEM INTERNODE X-SECTION



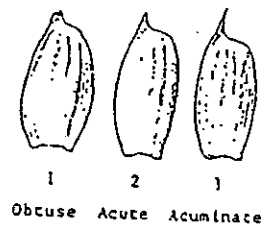
SPIKE SHAPE



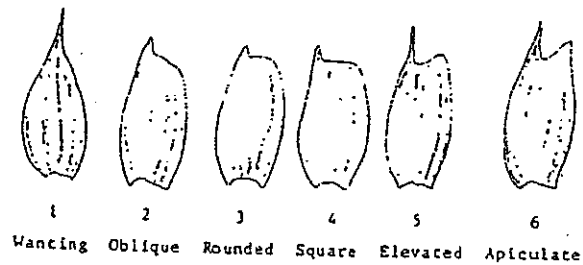
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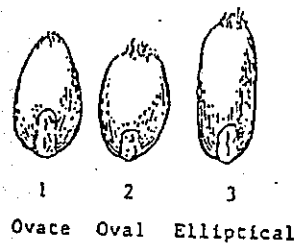
BEAK SHAPE:



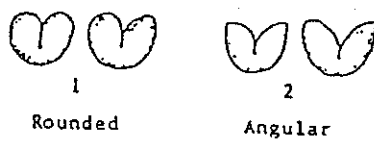
SHOULDER SHAPE:



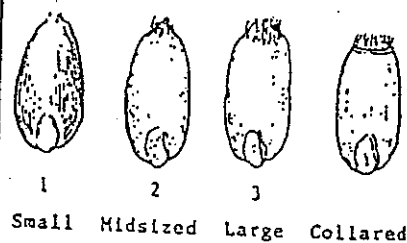
SEED SHAPE:



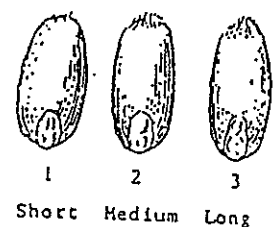
BEAK SHAPE:



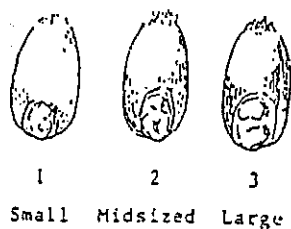
BRUSH SIZE:



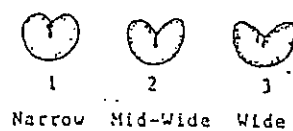
BRUSH HAIR LENGTH



GERM (EMBRYO) SIZE:



SEED CREASE WIDTH:



SEED CREASE DEPTH:

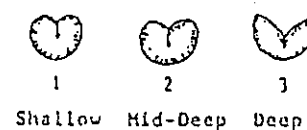


Exhibit D. Additional Description for 'TAM 111' Wheat (TX95A3091)

Milling and Baking Characteristics: Generally, TX95A3091, appears to have most milling and baking characteristics common to good hard-winter wheat varieties. In the 1999 and 2000 WPRPN (Table 3), the selection compares well with varieties known to have excellent milling and baking characteristics, including Arapahoe, Larned, Prowers and Trego, for hardness, milling score, mixing time, mixing tolerance, and crumb grain. In the very wet year of 1999, total protein of TX95A3091 was less than that of the other varieties, leading to reduced proof height and lower loaf volume. In 2000, however, protein levels were generally stronger, reflecting drier conditions that are more normal in this region during grain filling. Thus, TX95A3091 exhibited protein levels, proof height and loaf volumes intermediate among those of the check cultivars. Mixing tolerance and crumb grain scores for the selection were better than those for most of the checks in 2000.

Yield Performance: TX95A3091 has exhibited strong yield performance in dryland production on the Texas High Plains over a wide range of nursery environments. In 1996 at Bushland, the selection ranked third out of 40 entries with a yield of 13.6 bu/a in the Preliminary 1 yield nursery. The mean yield for that nursery was 8.2 bu/a, and yields for the check varieties, TAM W-101, TAM 107, TAM 202 and 2163, were, 6.9, 8.6, 5.4, and 6.1 bu/a, respectively. In the following two years, TX95A3091 was entered in the High Plains Dryland (HPD) nursery at 3 locations. In each year, at Bushland and Washburn, TX95A3091 ranked in the top 10 of the 40 entries (Table 4). In 1997, the selection ranked first at Bushland and second at Washburn. In 1998, the yield ranks were 10th at Bushland and 7th at Washburn. In 1997, the selection, averaged over locations, significantly outyielded all cultivar checks, while in 1998 one of the checks, TAM 107, yielded more than the selection, though not significantly more. TX95A3091 was also entered in the HPD nursery in 1999, grown at 3 High Plains locations, Bushland, Washburn and Stinnett, and ranked third, second and second, respectively, for yield, with an overall average yield rank of first, significantly more than 4 of the 6 check cultivars (Table 4). The data suggest that TX95A3091 may have some adaptation for the Rolling Plains region, as it ranked 10th at Chillicothe in 1997, and 3rd at that location in 1999 (nursery not harvested in 1998). The selection nevertheless will not be recommended for Rolling Plains production due to limited leaf rust resistance (see below). It is notable that in 1999 the mean yields for the HPD nursery at Bushland, Washburn and Stinnett were 64.3, 78.1 and 72.5 bu/a, respectively. Thus, it appears that TX95A3091 consistently outyields the average of other varieties or experimental lines when grown under rainfed conditions in the Texas High Plains, no matter whether the mean yields are very large or very small.

TX95A3091 was grown in the Western Plains Regional Performance Nursery (WPRPN) in 1999 and 2000. In 1999, the mean yield rank for TX95A3091 over all 7 replicated locations, ranging from Texas in the south to South Dakota in the north, was first (Table 5). Again, strong yield rank performance was recorded regardless of the mean yields at the various locations, which ranged from 71.4 bu/a to 28.6 bu/a. TX95A3091 significantly outyielded all check cultivars at Bushland, and at Akron, Colorado, as well as in the aggregate over all locations. In 2000, TX95A3091 ranked third regionally in that nursery, significantly outyielding 4 of the 6 check cultivars (Table 5). TX95A3091 was then entered in both the West Texas Elite Nursery and the Southern Regional Performance Nursery (SRPN) for 2000 and 2001, at a total of 38 locations, including 18 in the high plains region.

Data for 9 of the locations, in addition to regional and subregional means are provided in Table 6. In the 2000 SRPN, including all locations, TX95A3091 ranked 4th out of 45 entries, including the well adapted check cultivar, TAM 107, and the best inbred and hybrid selections from regional breeding programs. In the southern high plains subregion, TX95A3091 ranked 1st. The selection appears to have adaptation further north, as well, since it ranked 6th in the northern high plains subregion (data not shown). In the 2001 SRPN, TX95A3091 ranked 9th among the 45 entries over all locations, and 5th in the southern high plains subregion. Again, the selection ranked above all of the check varieties at all locations, and significantly outyielded them in regional and subregional mean yields (Table 6).

Insect and Disease Reactions: In the western Great Plains, where TX95A3091 is best adapted, the most significant diseases are caused by viruses, principally wheat streak mosaic virus (WSMV) and barley yellow dwarf virus (BYDV). Both of these diseases were present during the 1999-2000 crop year. Measurements made on plantings in the SRPN in that year indicated that, while not immune to these diseases, TX95A3091 was less affected by them than were the check cultivars and most experimental lines (Table 7). During the 2001 crop year, a rare outbreak of stripe rust, caused by *Puccinia striiformis*, was observed across much of the Great Plains. Measurements at multiple locations revealed that TX95A3091 was effectively resistant. Other workers reported that the resistance level was similar in response to the highly resistant variety, Jagger, and our data from the 2001 WTE nursery confirmed that consensus (Table 8). TX95A3091 has also been scored for response to other diseases and insects of importance in the Great Plains, but generally has no effective resistance to them. According to the USDA/ARS Cereal Disease Laboratory, St. Paul, Minnesota, TX95A3091 has been postulated to possess the *Lr18* gene for resistance to *Puccinia recondita*, the causal agent of leaf rust, though that gene has been overcome by widely occurring races. Susceptible reactions to leaf rust have been observed in the field in central and east Texas. The selection possesses both *Sr6* and the Amigo locus for resistance to stem rust. Reactions to *Septoria nodorum* and *Septoria tritici* at Overton and Dallas have indicated that TX95A3091 is moderately susceptible to each. Reactions of TX95A3091 to greenbug, Russian Wheat Aphid and Hessian Fly are all susceptible.

Response to Environmental Stresses: The broad range of environments in which TX95A3091 has been productive for grain yield suggests good adaptation to environmental stresses. In particular, in order to assay drought response, in the springs of 1998 and 2000, observations of green leaf-color retention were made for the nurseries in which TX95A3091 was entered. The 1999 crop year was too wet to permit such an analysis. Once water stress becomes severe, variation can be observed in the proportion of the youngest leaf that retains green color. Simultaneously, variation can be observed for leaf flatness, which should relate to availability of sunlight to the photosynthetic pigments. We have devised a 0-5 scale that incorporates both of these responses. Averaging the two years of response, TX95A3091 mean response was 2.7, more senescent than TAM-W101 (2.1), TAM 202 (2.3), TAM 107 (2.4), TAM 110 (2.4), and TAM 200 (2.6), but less so than Jagger (2.8), Custer (2.8), Akron (2.9), 2137 (3.0) and Scout 66 (3.3) (Table 9). As the only true measure of drought resistance is yield, TX95A3091 likely possesses resistance mechanisms not encompassed by this simple score.

Table 3. Milling and baking characteristics of TX95A3091 and check varieties in two nurseries^a.

Crop Year	Nursery	Cultivar or Selection	TKW	SKHS	Mill Score	FI Prot	FI Abs	Mix Time	Mix Tol	Proof Ht	Loaf Vol	Crumb Gr
1999	WPRPN	TX95A3091	32.8	63	81	9.4	61.3	4.83	4	6.5	750	4.0
		Larned	32.6	60	83	10.7	61.7	4.02	4	7.0	840	3.8
		Arapahoe	27.7	63	83	10.5	61.9	4.96	3	7.0	795	4.0
		Prowers	31.4	64	83	10.6	61.5	4.82	4	7.2	825	4.0
		Trego	31.8	70	82	10.2	61.4	4.37	4	7.1	860	3.8
2000	WPRPN	TX95A3091	23.7	73	85	13.1	64.5	3.38	4	7.2	875	4.0
		Larned	25.5	73	87	13.2	64.7	3.38	3	7.5	970	3.5
		Arapahoe	21.9	69	82	13.9	65.0	3.50	3	7.2	865	4.0
		Prowers	22.7	81	92	14.2	66.5	4.88	5	7.4	940	3.8
		Trego	24.8	80	82	12.8	63.2	2.88	2	7.4	900	2.8
		Millenium	22.1	75	84	13.5	64.2	3.88	2	7.4	875	3.5

^a Data provided courtesy of the USDA/ARS/Grain Quality and Marketing Laboratory, Manhattan, KS. Samples were evaluated in bulk, so that statistical differences cannot be obtained.

Table 4. Yield and yield rank^a (in parentheses) of TX95A3091 and check varieties in the High Plains Dryland Nursery.

Crop Year	Cultivar/Selection	Bushland	Chillicothe	Washburn	Stinnett	Mean
1997	TX95A3091	54.4 (1)	33.4 (10)	46.3 (2)		44.7 (2)
	TAM 200	46.3 (12)	16.3 (35)	41.4 (6)		34.7 (15)
	Larned	40.3 (25)	25.6 (26)	33.3 (27)		33.1 (18)
	Arapahoe	29.5 (39)	22.6 (29)	34.5 (24)		28.9 (29)
	TAM 107	36.4 (34)	6.1 (38)	32.4 (29)		25.0 (36)
	LSD (.05)	8.8	10.0	5.1		9.2
1998	TX95A3091	44.9 (10)		58.4 (7)		51.7 (7)
	TAM 200	44.3 (12)		55.6 (12)		50.0 (11)
	Larned	32.7 (36)		46.3 (28)		38.1 (32)
	Arapahoe	39.8 (26)		51.9 (19)		45.9 (22)
	TAM 107	48.1 (7)		60.9 (1)		54.5 (3)
	LSD (.05)	8.1		7.0		7.4
1999	TX95A3091	74.7 (3)	68.5 (3)	86.5 (2)	87.2 (2)	79.2 (1)
	TAM 200	64.6 (14)	66.2 (9)	79.8 (12)	79.8 (8)	72.6 (9)
	Larned	64.3 (16)	47.0 (38)	78.6 (15)	65.9 (32)	64.0 (23)
	Arapahoe	52.0 (34)	51.8 (35)	78.0 (18)	69.1 (28)	62.7 (27)
	TAM 107	61.4 (21)	61.1 (20)	71.3 (34)	72.4 (19)	66.6 (20)
	Akron	48.3 (38)	60.6 (21)	75.3 (25)	65.4 (33)	62.4 (29)
	TAM 302	67.0 (8)	60.4 (24)	90.4 (1)	72.4 (19)	72.6 (9)
	LSD (.05)	9.9	8.7	8.7	10.2	9.1

^aRank out of 40 entries in each year and at each location

Table 5. Yield and yield rank^a (in parentheses) of TX95A3091 in the WPRPN

Crop Year	Cultivar or selection	Bushland, TX	Akron, CO	Goodwell, OK	Colby, KS	Scottsbluff, NE	Archer, WY	Dakota Lakes, SD	Mean
1999	TX95A3091	77.7 (1)	63.4 (1)	85.5 (11)	72.9 (2)	40.3 (17)	42.2 (1)	76.8 (4)	63.0 (1)
	Trego	64.3 (14)	54.4 (14)	77.3 (16)	48.3 (27)	38.8 (21)	28.1 (27)	70.2 (15)	53.0 (19)
	Larned	61.1 (17)	53.7 (16)	75.9 (19)	59.3 (21)	33.8 (27)	36.4 (6)	53.1 (27)	51.8 (23)
	Arapahoe	57.4 (22)	52.9 (19)	69.2 (23)	65.0 (10)	46.4 (2)	36.2 (7)	64.4 (19)	54.1 (18)
	Prowers	49.9 (26)	54.5 (13)	71.9 (21)	58.0 (23)	42.1 (13)	35.3 (14)	56.7 (26)	50.9 (25)
	LSD (.05)	11.4	6.3	12.2	14.8	5.7	6.2	10.5	5.3
2000	TX95A3091	46.5 (6)	39.0 (2)	52.6 (9)	58.8 (16)	23.5 (4)	21.2 (13)	75.7 (5)	44.3 (3)
	Trego	46.8 (5)	37.0 (4)	50.4 (14)	61.1 (8)	21.9 (18)	18.7 (23)	75.0 (6)	43.4 (8)
	Larned	37.5 (21)	33.2 (10)	45.0 (23)	55.8 (21)	17.7 (31)	21.6 (11)	67.2 (19)	38.7 (23)
	Arapahoe	34.5 (25)	30.0 (21)	41.3 (28)	51.4 (26)	22.1 (14)	18.7 (21)	67.5 (17)	37.2 (26)
	Prowers	23.9 (31)	24.4 (30)	36.4 (31)	45.3 (29)	19.6 (27)	18.4 (26)	57.8 (29)	31.7 (30)
	Millenium	37.3 (23)	33.9 (8)	44.5 (24)	56.8 (20)	23.8 (3)	20.5 (16)	76.8 (4)	41.1 (15)
	LSD (.05)	4.8	7.9	8.2	9.1	4.1	4.6	10.1	4.8

^aRank out of 28 entries in 1999 and 32 entries in 2000.

Table 6. Yield and yield rank^a (in parentheses) of TX95A3091 and check cultivars in the SRPN.

Crop Year	Cultivar or selection	Clovis, NM	Bush ^b TX	Altus, OK	Hugo ^b KS	Ga C ^b KS	Walsh, CO	Sidney, NE	Da La ^b SD	SHP ^c	Mean ^c
2000	TX95A3091	39.4 (2)	50.1 (13)	62.7 (6)	50.7 (9)	52.0 (1)	39.4 (3)	64.1 (5)	82.8 (3)	50.6 (1)	56.1 (4)
	TAM 107	26.3 (31)	56.3 (1)	51.3 (29)	49.5 (11)	37.5 (29)	33.1 (14)	60.9 (16)	74.2 (14)	42.1 (18)	51.8 (16)
	Scout 66	30.5 (22)	40.7 (39)	19.0 (39)	30.3 (43)	24.8 (43)	23.9 (39)	54.3 (38)	54.5 (44)	33.4 (42)	39.1 (44)
	Kharkov	23.9 (36)	16.9 (45)	11.0 (45)	19.3 (45)	11.7 (45)	14.4 (45)	40.2 (45)	34.3 (45)	19.8 (45)	27.5 (45)
	LSD (.05)	13.2	5.0	8.8	11.9	6.7	8.7	8.9	9.6	6.6	3.6
2001	TX95A3091	n/a ^d	53.6 (12)	59.8 (11)	n/a	n/a	33.7 (13)	n/a	n/a	60.9 (5)	53.5 (9)
	TAM 107	n/a	52.2 (22)	58.3 (16)	n/a	n/a	27.1 (30)	n/a	n/a	52.3 (23)	48.5 (31)
	Scout 66	n/a	43.4 (44)	48.2 (43)	n/a	n/a	30.7 (19)	n/a	n/a	47.2 (36)	42.2 (43)
	Kharkov	n/a	44.2 (43)	37.5 (45)	n/a	n/a	26.4 (33)	n/a	n/a	34.9 (45)	35.6 (45)
	LSD (.05)	n/a	3.4	8.1	n/a	n/a	7.8	n/a	n/a	7.1	4.5

^aYield rank out of 45 entries

^bLocations abbreviated are: Bushland, TX, Hugoton, KS, Garden City, KS, and Dakota Lakes, SD.

^cRegional means are given for the Southern High Plains subregion (SHP) and for all 33 regional sites

^dData from these locations were unavailable at this writing.

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Table 7. Reaction of TX95A3091 and check varieties to viral diseases.

Cultivar or Selection	WSMV	BYDV			
	Hays, KS ^a	Prosper, TX ^a	Burlington, CO ^a	Columbia, MO ^b	Hays, KS ^b
TX95A3091	5(4) ^c	2(2)	3(3)	31(13)	11(8)
Kharkov	8(28)	6(41)	9(45)	45(37)	38(41)
Scout 66	8(28)	5(37)	8(44)	57(44)	45(43)
TAM 107	5(4)	3(12)	3(3)	46(38)	11(8)

^aResponse recorded on a 0-9 scale, 0=no infection, 9=complete coverage.

^bResponse recorded as percentage of plants infected.

^cNumbers in parentheses are response rank, out of 45 total entries in 2000 SRPN.

Table 7. Reaction of TX95A3091 and check varieties to stripe rust in 2001.

Cultivar or selection	Bushland ^a		Washburn ^a	
	reaction ^b	coverage ^c	reaction ^b	coverage ^c
TX95A3091	R	0	R	2 ^d
2137	S	83	S	92
Custer	S	77	S	80
Jagger	R	0	R	0
Ogallala	MS	20	MS	27
TAM 107	S	70	S	87
TAM 110	S	66	S	80
TAM 202	S	62	S	66
LSD (.05)		4		6

^a Locations of 2001 WTE nursery at which stripe rust reaction was scored.

^b R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible, based on size and development of pustules.

^c Percentage of flag leaf area covered by pustules.

^d One plot contained plants that may have been diseased, though natural leaf senescence may have obscured the result.

Table 9. Response to drought^a of TX95A3091 and check cultivars at Bushland, TX in two years.

Cultivar or Selection	1999	2000	Mean
TX95A3091	2.4	2.9	2.7
TAM W-101	1.8	2.3	2.1
TAM 107	2.2	2.6	2.4
TAM 110	2.2	2.5	2.4
TAM 200	2.3	2.9	2.6
TAM 202	2.0	2.6	2.3
2137	2.5	3.5	3.0
Akron	2.3	3.5	2.9
Custer	2.5	3.1	2.8
Jagger	2.4	3.2	2.8
Scout 66	3.0	3.7	3.3
LSD (.05)	0.3	0.2	0.3

^aVisual scores on a 0-5 scale for the youngest fully expanded leaf (0=green, flat leaf; 1=green, rolled leaf; 2=leaf with senescent tip; 3=less than half of leaf senescent; 4=more than half of leaf senescent; 5=fully senescent leaf).

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

EXHIBIT E**STATEMENT OF THE BASIS OF OWNERSHIP**

1. NAME OF APPLICANT(S) Texas Agricultural Experiment Station	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER TX95A3091	3. VARIETY NAME TAM 111
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) Office of the Director, TAES 2147 TAMU College Station, TX 77843-2147	5. TELEPHONE (Include area code) 979-845-4747	6. FAX (Include area code) 979-458-4765
7. PVPO NUMBER 200300291		

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain.

☒

YES

☐

NO

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country.

☒

YES

☐

NO

10. Is the applicant the original owner?

☒

YES

☐

NO

If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☐

YES

☐

NO

If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☐

YES

☐

NO

If no, give name of country

11. Additional explanation on ownership (Trace ownership from original breeder to current owner. Use the reverse for extra space if needed):

TAES policy and handbook manual provide that all germplasm and varieties developed by its employees in the course of their duties are owned by TAES. A copy of this policy is provided for your records.

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, D.C. 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

TEXAS AGRICULTURAL EXPERIMENT STATION HANDBOOK



NUMBER 1250B

PAGE 1 OF 8

ISSUED: March 31, 1995

STANDARD PROCEDURE

MANAGEMENT AND RELEASE OF NEW PLANT MATERIALS

1.00 PURPOSE AND BACKGROUND

The purpose of this document is to outline guidelines for the management and transfer of plant materials developed by the Texas Agricultural Experiment Station (Experiment Station) recognizing diversity in agronomic, horticultural, and industrial plant programs. The terms "plant material" and "seed" are intended to be all-inclusive, including vegetatively propagated plant materials, such as sprigs, rhizomes, or buds.

The Experiment Station, as part of the Texas A&M University System (System), and in cooperation with the Texas Agricultural Extension Service (Extension), conducts research in crop breeding and genetic improvement to benefit the public and support the educational mission of Texas A&M University (TAMU), including the development and release of improved germplasm and new crop cultivars.

The Experiment Station, part of the public agricultural research system, has a broad mission to serve agriculture, particularly farmers and the general public. Farm, commodity, and trade organizations are encouraged to provide suggestions to enhance crop improvement and the distribution of new plant materials. Plant materials are considered as intellectual property and are owned and managed by the Experiment Station, under System policies.

Three basic goals are summarized in Section 2.00 to guide release decisions. General guidelines and methods are outlined in Section 3.00 for transferring plant material for private and commercial uses. The classification of plant materials and types of releases is intended to assist both the breeder and seed users in understanding some alternatives in managing releases. Partnerships, joint incentives, and sharing of research materials are encouraged.

DISTRIBUTION:

ALL HANDBOOKS

APPROVAL:

Edward A. Hiler
EDWARD A. HILER

2.00 GOALS IN PLANT MANAGEMENT AND RELEASE

Three general goals provide the basic criteria for the management of plant materials and release decisions. These goals include:

- A. Maximize Public Benefit. Plant material must be utilized by farmers and consumers to benefit the public. Plant material must be increased and managed to retain genetic purity. Variety or designated names provide identity and recognition to the originator of the improved plant materials. Commercial production and the distribution of plant releases are essential for both large and small acreage crops. Protection agreements and licensing provisions are frequently necessary to complete research and assure transfer of materials to the private sector.
- B. Assure Technology Transfer to the Private Sector. The Experiment Station serves as a primary producer and distributor of new plant materials and depends upon the private sector to increase and market seed. State and federal plant protection provisions, protected names, trademarks, and/or markers (such as biochemical identification) may be useful in transferring technology to the private sector.
- C. Recover Costs and Generate Revenue. The generation of funds through seed sales, fees, and other business terms is essential to recover some development costs and protection expenses, maintain competitive science, and enhance future crop improvement research. Financial terms and license provisions on plant materials must be realistic and consistent with the biological potentials and business environment.

3.00 GENERAL GUIDELINES AND KEY PARTICIPANTS

- A. General Guidelines are outlined below for the orderly equitable release, distribution, and protection of plant materials.

Partnerships and Cooperation. The Experiment Station is responsible for research in crop breeding and genetic enhancement and assuring the timely transfer of this work to agricultural, scientific and industrial communities. Cooperation among the faculty and between faculty and external scientific and industrial interests is essential. Private interests are increasingly providing resources for research, in return for some preferential access to plant products and new technology. The commercialization of research had been encouraged both by Legislative mandates to the Experiment Station and through actions by the Board of Regents to provide financial incentives to faculty and staff to develop products or services of commercial usefulness.

Plant Release Proposals - Early discussion with Texas Foundation Seed Service (TFSS), the Plant Review Committee (PRC), and the System Technology Licensing Office (TLO) is encouraged in planning a new release. The breeder generally assumes a lead responsibility for preparing and submitting the Release Proposal (outlined in Section 5.00). Plant material is considered to be owned and under the stewardship of the Experiment Station. If a decision is made to not release particular plant materials, then the disposition and use of that material remains the discretion of the Experiment Station.

Exchange and Distribution. Exchange of plant material for breeding and genetic research is encouraged for public institutions and private industry and may include regional testing, Extension trials, and cooperative evaluations. "Selected Plant Materials" (see Section 4.00) may be provided to private firms, public breeders, grown on private lands, or placed with a private producer for further commercial evaluation before it is formally released.

Transfer and Protection - The formal release and transfer of new plant materials will usually involve public notices of availability and may involve Requests for Proposals or expressions of interest from private firms and/or the transfer of intellectual property rights through the use of licenses and agreements. The Experiment Station, in conjunction with the Breeder and the TLO, will consider applications for the appropriate intellectual property protection such as Certificates of Plant Variety Protection, Plant Patents, or Utility Patents in facilitating the transfer and protection of new plant materials. Additionally, in some instances individual firms and/or industrial groups may enter into research or partnership agreements on intellectual property, to gain access to genetic products.

Distribution of any plant material should be documented to avoid premature release, unauthorized distribution, misunderstandings over ownership, or loss of intellectual property rights. Protection agreements during research help assure that private firms can acquire rights and marketing opportunities later and/or protect their investment in marketing new products. Material Transfer Agreements (MTAs) are to be used in providing material to private firms and public agencies for evaluation (with copies filed with Texas Foundation Seed Service and the Technology Licensing Office).

B. Roles of Key Participants

Scientific quality, summary of research, review of proposals, and technology transfer involve several individuals and groups working together. Successful plant release includes institutional flexibility to meet the needs of each crop or release. Roles of primary participants are outlined as follows:

Plant Breeders and other scientists provide the major leadership in research and the release of plant materials. Responsibilities include research planning, periodic reviews on future releases, assuring materials are adequately protected, preparation of release proposals, and suggesting ways to implement release. A team is frequently involved with a release and may involve several disciplines and recognition of co-worker contributions.

Cooperative evaluations are encouraged, particularly with Extension Specialists. The Plant Review Committee commonly looks for Extension participation on new variety releases. Breeders maintain Breeder Seed and may provide technical or advisory assistance to TFSS, TLO or commercial firms.

Department Heads and Resident Directors provide a key role in crop improvement programs by guiding coordination between disciplines, and helping assure the TFSS, TLO and others are aware of potential releases. These Administrative Heads provide a vital linkage in planning, implementation and guidance for the total crop improvement program.

Program Coordinators provide communication among the developers of plant materials, the seed industry, and crop producers on scientific progress and the transfer of new materials into crop productions. The Head of the Department of Soil and Crop Sciences and Resident Director of Research at the Texas A&M Agricultural Research and Extension Center at Beaumont serve as Program Coordinators for all field crops and turfgrass, while the Head of the Department of Horticultural Sciences serves as the Program Coordinator for fruit, vegetable, and nut crops, including emphasis on industry relationships. Activities of Program Coordinators include:

1. Effective communication among breeders, department heads, resident directors, and with industry and producer interests;
2. Development of new partnerships between the Experiment Station and industry/producer interests, plus industry relationships and liaison with industry associations;
3. Advising the Director on release and licensing issues, and interacting with the Technology Licensing Office as appropriate. The Coordinators will report to the Director of the Experiment Station in these roles.

The Texas Foundation Seed Service, located at Vernon, will be responsible for the production of foundation seed and assisting breeders in the production of breeder's seed, as requested, and/or where required by a contract or license agreement managed by the TLO. The operation is expected to be largely self-sufficient.

TFSS works with TLO, other Foundation Seed organizations, Crop Improvement Associations in other states, the Texas Department of Agriculture, USDA, and other state and federal agencies. When plant materials are licensed or managed under an agreement, TFSS works closely with the TLO.

TFSS works with a lead Extension Specialist to coordinate seed for county and regional field tests, manages the increase and distribution of foundation seed stock and handles revenues from seed sales and nonlicensed products.

The Plant Review Committee (PRC) is a standing internal committee appointed by the Director of the Experiment Station to oversee the orderly release of plant materials, provide guidance to TFSS and TLO, and to make recommendations to the Director of the Experiment Station on plant materials. Activities of the PRC include:

1. Establish technical review panels to evaluate release proposals.
2. Hold quarterly meetings to review release proposals and meet with breeders who are planning releases, and act on release proposals.
3. Provide recommendations to the TFSS, TLO and Director's Office on release proposals, cultivar names, and agreements on licensing and advise the Director of the Experiment Station on release and licensing issues. If a question arises between faculty on "proportional creativity" or royalty sharing, the PRC may make recommendations to the Experiment Station Director.

The Technology Licensing Office is involved in initial discussions and planning with breeders, unit heads, Program Coordinators, and TFSS on planned releases suitable for licensing. In conjunction with the Program Coordinators and breeders, the TLO provides leadership and initiative for the protection and management of intellectual property for new releases including the following services:

1. Management of license and royalty agreements;
2. Marketing of new selected plant materials to commercial firms;
3. Development and negotiation of license and evaluation agreements;
4. Management of intellectual property protection;
5. Advice on business strategies and intellectual property protection issues; and
6. Advises and keeps the Assistant Vice Chancellor for Administration (Agriculture) who represents the Experiment Station apprised of all services provided by the TLO in the management of new plant materials.

4.00 TYPES OF RELEASES AND PROTECTION

A. Classes of Material - Improved plant materials may result from genetic manipulation by plant breeding and/or molecular and cellular biology. For purposes of management and release, plant materials are classified as follows:

1. Genetic Stocks: Research in plant breeding, genetic and/or cellular and molecular biology may produce unique genetic characteristics or distinct genetic materials useful to other researchers. Examples include specific genetic characters, genes or gene constructs involving vectors, and promoters. An essential characteristic of genetic stocks is that they have no immediate commercial value.
2. Germplasm: Germplasm is commonly used to further research, with little value for increase or direct commercial use in its present form. However, some desirable characters may be immediately useful to breeders and industry in developing improved varieties in other research programs.
3. Breeding Lines: Breeding lines may contain useful characteristics of unique traits with apparent commercial value. Breeding lines may be increased in their present form, used for selection, or tested further before commercialization. The Experiment Station may choose to release some advanced materials as "breeding lines" rather than continue research for commercial applications as varieties or inbred lines.
4. Selected Plant Material: Selected plant materials may be transferred to public or private firms for cooperative research, usually under a protection agreement, for further development, feasibility studies, or commercial exploration.
5. Commercial Varieties or Parental/Inbred Line: These plant materials are released for direct commercialization as new varieties or production of hybrids; release depends on clear demonstration of performance or traits in several experiments over several years, locations and/or conditions.

B. Types of Releases and Transfer

Release of plant materials is based on several factors (such as crop species, means of propagation, and commercial potential). Flexibility is essential to meet specific economic, biological or industry needs. Alternatives for release and distribution of plant materials include:

1. Unrestricted Unlimited Release - An Unrestricted Unlimited Release is intended for general uses of those plant materials with undefined uses or low commercial potential, without any restrictions on research or commercialization uses. One-time fees may be requested to recover costs.
2. Restricted Release - A Restricted Release designates specific uses for plant material, with an agreement with recipients, noting restrictions, applications, and mutual interests.
3. Limited Release - A Limited Release involves specific recipients, to enable selected firms to use plant materials. Agreements may be developed with a small number of firm(s), firms selected on the basis of their proposal, and/or provide a protected position for a single firm or organization to complete research and/or assume commercial development. Limited Releases are usually managed under a license or option agreement, with financial terms and performance expectations.
4. Unreleased Transfer - Some plant materials may not be immediately released but simply provided to others for additional research or commercial feasibility studies. "Selected Plant Materials" may be managed under a Material Transfer Agreement or an Option Agreement, until specific traits and usefulness are determined and a formal release is proposed.

C. Pre-release Protection is essential to clarify ownership and transfer uses and rights to others later. Material Transfer Agreements (MTAs) and other sample documents are available from TLO. A copy of all pre-release documentation (MTA's and other documents) should be provided by the breeders to the Technology Licensing Office, Foundation Seed Service and Program Coordinators.

Exchange of plant materials for research uses with other public breeders may be handled directly by the breeders, through an MTA with the (1) identification and quantity of materials being provided to a co-worker, (2) clarifying the anticipated uses for breeding and research purposes, (3) stating that the Experiment Station retains its ownership, and (4) obtaining written acknowledgment from the recipient.

Field testing and commercial scale evaluations are encouraged, involving other breeders, Extension Specialists, farmers or others. Most commonly seed for one season is provided for field trials and is not to be retained or transferred to others. An MTA should be completed with farms or cooperators to clarify expectations.

5.00 THE RELEASE PROPOSAL AND PROCESS

- A. Release proposals are prepared by the breeders and summarize the background, current facts, and plant performance/traits. The release proposal may vary in detail, depending on the class of plant material (please see Section 4), however all release proposals should include these sections:

1. Background - information on the source, origin, or breeding history.
2. Performance and Traits - summary of key features, data, anticipated usefulness, and/or disclosure limitations or unknown features. This section may be brief for germplasm and more detailed for a variety (including details on yields, statistics, quality, host plant resistance, and regions of adaptation).
3. Seed production and availability - type and quantity of seed availability for increase or distribution.
4. Implementation - breeder's suggestion on notifications, release and distribution, and guidance for outreach (including protection as appropriate) and revenue sharing (for royalties, if others were involved in the creative development).

The Release Proposal should be prepared for internal review with sufficient data and information for a peer group to evaluate merits and make decisions. Alternatively, the Release Proposal may be prepared (or later converted) as a Station publication, to document research and provide technical information for others.

- B. Registration Article (for submission to a professional journal) should be with the proposal for a new variety or germplasm release. Include a draft of the Experiment Station Leaflet for new varieties. The original and 15 copies of the entire package Release proposal, Registration Article, and Leaflet (as appropriate) should be submitted through the administrative head and Program Coordinator to the PRC (with one copy to the Foundation Seed Office) eight weeks before the quarterly PRC meetings. Additional information on preparing and submitting releases is available from the PRC Chair.

C. Revenue Distribution

Royalties or income generated from the commercialization of plant materials will be distributed to the inventors on all types of plant material, according to the TAMU System policy on intellectual property (System Policy 17.02, Patents). Scientists involved in the development of plant materials that generate royalties or income under a license or option agreement must agree in advance regarding proportionate contributions and sharing of expected income prior to the distribution of such income.

(This revision replaces Standard Procedure 1250A, dated August 3, 1992)

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